PROPOSED PLAN
for Cleaning Up Pollution
at Eight Areas on March Air Reserve Base
Operable Unit 2

The soil and groundwater treatment system at Site 36

We invite you to tell us what you think about our proposal to clean up pollution in the soil and groundwater at eight sites on March Air Reserve Base. The Reserve Base is the portion of the former March Air Force Base used by the Air Force Reserve Command.

At these sites, cleaning solvents, fuels, and other chemicals were spilled or dumped into the soil during normal operations at the base. At some sites, the chemicals also leaked into the groundwater.

The eight sites are grouped into a unit called Operable Unit 2, or OU2. Putting them into a group means we can study and clean up several sites at once. This makes the cleanup go faster and cost less. The map on page 2 shows these sites.

This Proposed Plan describes each site, the different options for cleaning it up, and the option we propose as being the best solution for each one. You can read more detailed information on these sites in the "Remedial Investigation" and "Feasibility Study" reports (see page 10 for details).

Mail or email us your comments on this Proposed Plan during the comment period from August 25 through October 8, 2003. We also invite you to attend a public meeting on September 18, 2003. The box below has more details.

How You Can Be Involved

There are two ways you can tell us what you think of this Proposed Plan: send us comments in writing during the comment period, or tell us in person at the meeting.

Public Comment Period
August 25, 2003 through October 8, 2003

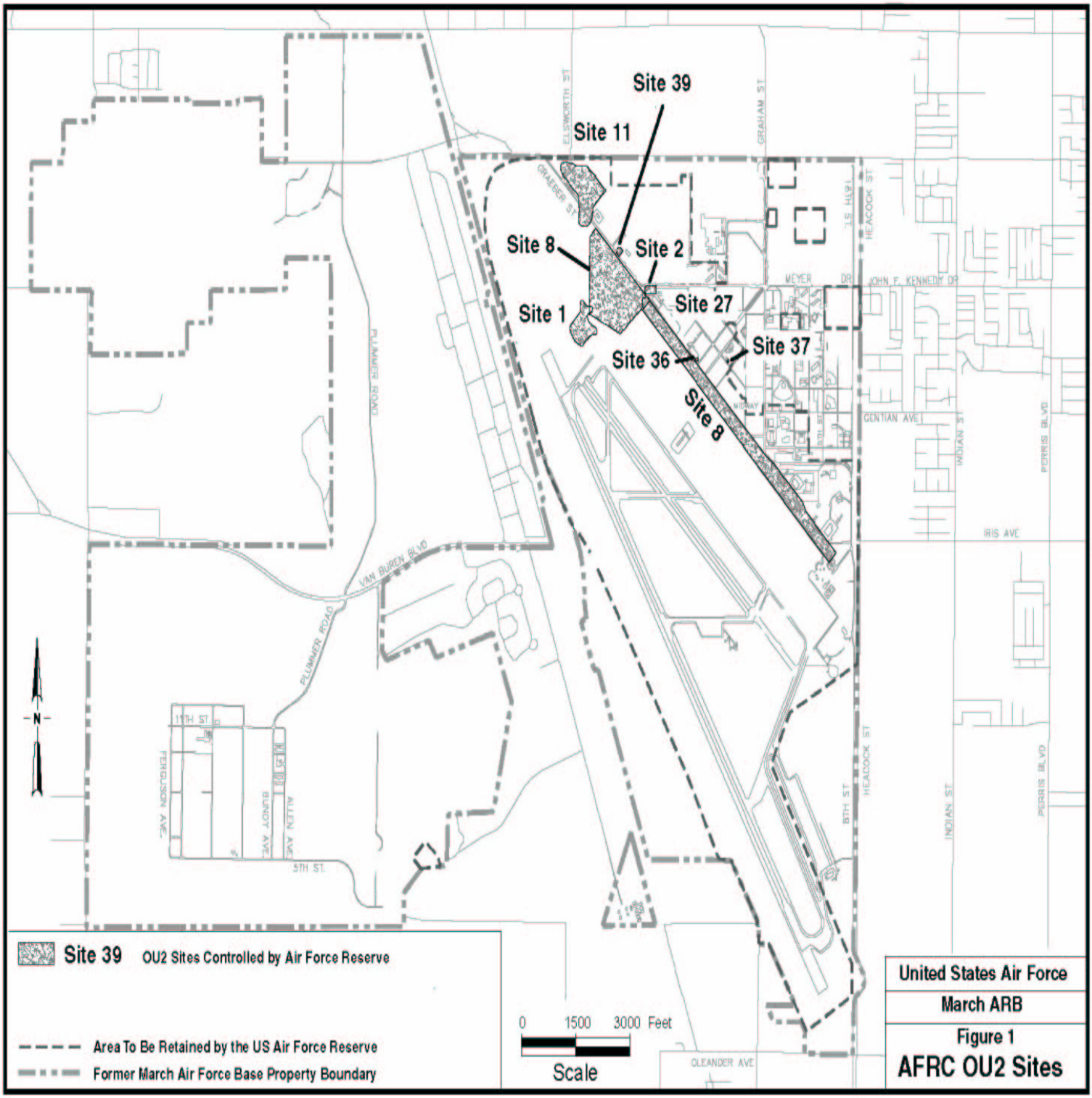
Written comments must be postmarked or emailed no later than October 8, 2003 and sent to: Eric Lehto, Project Manager, 452 MSG/CEV, 610 Meyer Drive, March ARB, CA 92518-2166
email: Eric.Lehto@march.af.mil

Public Meeting
September 18, 2003
7 p.m.
Ben Clark Public Training Center, Riverside

The meeting is an opportunity for you to hear more about the sites and the proposed cleanup, ask us questions, and give your comments. For directions, please call Eric Lehto at (909) 655-5060.

MAP of OU2 Sites

See Figure 1 PDF



No current risk to public health

The contaminated (polluted) soil and groundwater at these sites are *not* a public health risk at this point. That's because the soil is either covered by asphalt, or the contamination levels are low enough to be safe for the current land use. The groundwater is not used for drinking water or any other purpose.

The sites are also not a risk to the environment (plants and animals) for the same reasons. The soil is covered, and the water is deep underground where no animals or plants are exposed to it. Also, these sites are industrial areas where there is no wildlife.

However, we need to clean up the groundwater so that the contamination can't spread, and so that it would be safe in case it were ever used in the future. We also need to clean up the soils that are leaking chemicals into the groundwater.

The cleanup is part of the base's Installation Restoration Program (IRP). This is a Department of Defense program to look for, study, and clean up hazardous waste on military bases from past military activities.

How we propose to do the cleanup

At four sites we propose to clean up both the soil and the groundwater. For the soil we would use a system called "soil vapor extraction." This consists of pulling the chemical vapors out of the soil with a vacuum system, then cleaning the chemicals out of the air using carbon filters. We already have pilot soil vapor extraction systems in place and working at most of the sites. We wanted to test how well these systems would work. We also wanted to start cleaning up the soil while we continued to study all the options.

For the groundwater at these four sites we would pump the water out of the ground, then put it through carbon filters to get out the chemicals. At most of the sites we have pilot groundwater treatment systems in place.

Brief History of March Air Force Base/Air Reserve Base and the Cleanup Program

The former March Air Force Base is located next to the cities of Riverside, Moreno Valley, and Perris in Riverside County, California. The Base began operations during World War I and has hosted a variety of historical military activities. It has been a refueling base, a bomber base, and a support base. Other military activities included gunnery and fire training, fuel storage, cargo transport, and aircraft maintenance.

In 1993, March AFB was designated for realignment by Congress and all active duty units left by April 15, 1996. The Air Force Reserve took over a portion of the Base which is now called March Air Reserve Base (ARB). The rest of the former base is being transferred for civilian reuse by the Air Force Real Property Agency.

Base activities have involved hazardous wastes that caused soil and groundwater contamination. In 1983, the Air Force began studying the potential environmental problems at March AFB. This Proposed Plan covers the OU2 sites that are the responsibility of the Air Force Reserve.

At two other sites we propose to make sure that the land use stays industrial, which is a safe use for those areas where the contamination levels are very low. At the last two sites we propose no further action since we have already cleaned up the soil or the soil did not need to be cleaned up.

Your comments will help us make our final decision about the cleanup

We prefer these remedies but we won't make a final decision until we have considered your comments. We will address all comments in a document called a "Response to Comments." This will be included in the Record of Decision (ROD). The ROD is the formal document that describes the final remedies we choose for the OU2 sites.

The cleanup team includes State and Federal regulatory agencies

Because the cleanup program at March Air Reserve Base follows federal and state laws, the cleanup team includes several regulatory agencies. These are the U.S. Environmental Protection Agency (EPA), and two groups from the California EPA: the Department of Toxic Substances Control, and the Santa Ana Regional Water Quality Control Board.

These agencies oversee the cleanup to make sure that it protects human health and the environment. They also make sure that it follows all laws and regulations that apply. These laws include CERCLA (the Comprehensive Environmental Response, Compensation, and Liability Act) and the NCP (National Contingency Plan). These are described in the Glossary on page 10.

How this Proposed Plan is different from the one we put out in 1997

In 1997, the Air Force put out for public review an OU2 Proposed Plan that had 23 sites. It included the eight sites described in this current Proposed Plan. Since that time, the 15 other sites have been put under the control of the Air Force Real Property Agency (formerly the Air Force Base Conversion Agency). They put out a separate Proposed Plan for their 15 sites in August 2000. This current Proposed Plan has the same preferred cleanup options for the eight sites as the one first put out in 1997. The only difference is that the original set of sites was split between the two Air Force agencies.

Site descriptions and history

Below are the descriptions of each site, including what types of chemicals are present and how they got there. Table 1 on pages 6 and 7 shows a summary of the soil and groundwater contamination at each site. The table also lists what the possible health risks would be if people were exposed to the soil or groundwater. (No one is currently exposed.)

Site 1 – Aircraft Isolation Area

Site 1 is next to the northern taxiway that connects the runway to the aircraft parking apron. During the early 1960s fuel was drained from aircraft and put into portable tanks to take to other areas of the base. Some of the fuel may have been drained directly onto the ground. Cleaning solvents such as TCE (trichloroethene) may have also been dumped here. The soil contains contains chemicals called PAHs (polycyclic aromatic hydrocarbons), which may have come from aircraft exhaust (not the fuel spill).

After discussions with the regulatory agencies, we took out about 3,200 cubic yards of soil from the site and placed it in the Site 6 waste cell on base. Much of Site 1 was later used for building the new California Air National Guard alert facility. The site is recorded on the Base Comprehensive Plan as being for industrial use only.

Site 2 – Waste Oil Tanks/Solvent Tanks

Site 2 is at the corner of Graeber Street and Meyer Drive. The Air Force had an aviation gasoline fueling station at this site from the early 1940s through the late 1950s. Fuel from the station leaked into the soil and down into the groundwater. When the gas station closed, we took out the fuel storage tanks. The site is now used as a parking lot.

Site 8 – Flightline Shop Zone

Site 8 runs the entire length of the flightline and includes buildings used for many years to support flightline operations. The site includes some of the oldest structures on the Base, such as hangars and aircraft maintenance buildings from the 1920s and 1930s. Chemicals from fuels and cleaning solvents leaked into the soil and the groundwater.

After discussions with the regulatory agencies, we dug

out some of the surface soil that contained PAHs. We put the soil in an approved landfill off base in 1997. The site still has some contaminated soil, which has cleaning solvents and chemicals called BTEX (benzene, toluene, ethylbenzene, and xylene), which come from fuels. It also has groundwater that contains solvents and BTEX.

Site 11 – Bulk Fuel Storage Area

Site 11 is a fuel tank farm of about 20 acres in the northeast corner of the Base near the main gate. In 1976, 10,000 gallons of fuel spilled onto the ground. Most of the fuel was recovered, and the rest evaporated. The soil contains PAHs, which may have come from aircraft exhaust (not the fuel spill). The site is shown on the Base Comprehensive Plan as being for industrial use only.

Site 27 – Building 422 Underground Tanks

Site 27 is a former gas station and petroleum, oils, and lubrication storage area, just across Graeber Street from Site 2. Six 50,000-gallon underground storage tanks were installed in 1941 and removed in January 1996. Gasoline and oils leaked from the storage tanks into the soil and down into the groundwater.

Site 36 – Building 458 Leach Pit

Building 458, built in 1929, was used for repairing jet engines. Solvents such as TCE used in parts cleaning were drained to a pit. From the pit they leaked into the soil and groundwater. After discussions with the regulatory agencies, we took out some contaminated soil and filled the pit with concrete. The site still has some soil with TCE and other solvents, and the groundwater contains TCE and other solvents.

Site 37 – PCB Spill at Building 317

Site 37 is a former transformer area. Transformer fluid that had PCBs (polychlorinated biphenyls) was spilled in 1983. The soil has small amounts of PCBs. There is no contamination in the groundwater.

Site 39 – Abandoned Gas Station

Site 39 is a former Base Exchange gas station, built in 1971. It had four 10,000-gallon underground gasoline tanks that were removed in 1991. When we took out the tanks we found some soil contaminated with fuel. There is no fuel in the groundwater.

Finding the possible health risks

After we found out the types and amounts of chemicals at each site, we performed a study called a health risk assessment. Using the health risk assessment we calculated the potential harm to human health from each site.

To do the health risk assessment we looked at two main things: 1) the known health effects from each chemical, and 2) the possible ways people might be exposed to the chemical. There would only be health risks if people came in direct contact with the chemical, such as getting contaminated soil on their skin, breathing in chemical vapors or dust from the soil, or ingesting (eating) it. People can ingest the chemicals by drinking contaminated water, or by getting contaminated soil on their hands and then handling food without washing their hands.

The results of the health risk assessment for each site are shown in Table 1 on the next two pages. Table 2 shows the levels of chemicals found in the groundwater at each site compared to the cleanup levels set by EPA. As we said earlier, none of these sites is a risk to human health at this point because no one is exposed to the contaminated soil or groundwater.

Comparing cleanup options and choosing the best method for each site

We started by looking at a number of cleanup options for each site, then cutting the list down to the most feasible (workable) ones. We then studied the short list of options in depth to choose the one that we believed would best protect human health and would be cost-

Table 1: Summary of Chemicals in the Soil and Groundwater, and Results of the Health Risk Assessment at Each Site

Site Name	Chemicals in the Soil	Chemicals in the Groundwater	Possible Health Risk
Site 1 Aircraft Isolation Area	Site sampling found no significant amount of fuel or solvents, but there were high levels of PAHs. About 3,200 cubic yards of soil were removed and placed in the Site 6 waste cell on base.	We found no significant groundwater contamination at the site.	After we removed the soil, the regulatory agencies agreed that the site had been cleaned up to a level safe for industrial land use. The groundwater is not affected so no groundwater cleanup action is needed.
Site 2 Waste Oil Tanks/ Solvent Tanks	A large amount of the soil below the surface is contaminated by fuel components such as BTEX; chlorinated solvents; and PAHs.	The fuel and solvents have contaminated the groundwater under this site and have combined with the groundwater plume from Site 27.	Actual health risks would only occur if people come in direct contact with the chemical. The potential risk is unacceptably high, ranging up to four additional cases of cancer for 1,000 people exposed. The potential non-cancer health risk is also unacceptably high, with a Hazard Index of 90. A Hazard Index above 1 is considered unsafe. However, this is only *potential* risk. No one is exposed to the soil because it is covered with asphalt, and the groundwater is not being used.
Site 8 Flightline Shop Zone	Soils in several areas at this site have high levels of solvents and fuel components (such as BTEX).	The fuel and solvents have contaminated the groundwater under this site.	As with Site 2, the potential risk is unacceptably high, ranging up to three additional cases of cancer for 1,000 people exposed. The potential non-cancer health risk is unacceptably high, with a Hazard Index of 40. A Hazard Index above 1 is considered unsafe. However, this is only *potential* risk. No one is exposed to the soil because it is covered with asphalt, and the groundwater is not being used.
Site 11 Bulk Fuel Storage Area	Soil sampling found elevated levels of PAH in the surface soil but no significant amount of fuel contamination (most of the fuel spilled on the surface evaporated).	We found no significant groundwater contamination at the site.	Levels of PAHs were found to be higher than the EPA's risk range for residential soil, but are within the acceptable range for industrial soils.

BTEX	benzene, toluene, ethylbenzene, and xylene
EPA	U.S. Environmental Protection Agency
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
TCE	trichloroethylene

Table 1 (continued): Summary of Chemicals in the Soil and Groundwater, and Results of the Health Risk Assessment at Each Site

Site Name	Chemicals in the Soil	Chemicals in the Groundwater	Possible Health Risk
Site 27 Building 422 Underground POL Tanks	A large amount of soil below the surface had been contaminated by fuel components. The soil also had some PAHs and solvents.	Fuel and solvents have contaminated the groundwater under this site and have combined with the groundwater plume from Site 2.	This site is similar to Site 2. The potential risk is unacceptably high, ranging up to three additional cases of cancer for 1,000 people exposed. The potential non-cancer risk is also unacceptably high, with a Hazard Index of 90. A Hazard Index above 1 is considered unsafe. However, this is only *potential* risk. No one is exposed to the soil because it is covered with asphalt, and the groundwater is not being used.
Site 36 Building 458 Leach Pit	Solvents such as TCE were drained to a leach pit, contaminating the soil and groundwater. After discussions with the regulatory agencies, we removed some contaminated soil and the filled the leach pit with concrete.	Solvents such as TCE have contaminated the groundwater at the site	The increased potential cancer risks are unacceptably high, ranging up to two additional cases of cancer for 100 people exposed. The potential non-cancer health risk is also unacceptably high, with a Hazard Index of 300. A Hazard Index above 1 is considered unsafe. However, this is only *potential* risk. No one is exposed to the soil because it is covered with asphalt, and the groundwater is not being used.
Site 37 PCB Spill at Building 317	Fluid suspected of containing PCBs was spilled in 1983. The soil was sampled and removed; however, the records are incomplete. We sampled the site again in 1993, and found small amounts of PCBs.	We found no groundwater contamination at the site	The small amounts of PCBs found are within EPA standards for residential use. The primary risk from PCBs is cancer. At this site the cancer risk is two additional cases of cancer for 100,000 people exposed, which is within the EPA's acceptable risk range.
Site 39 Abandoned Gas Station	In 1991, the four 10,000-gallon underground gasoline tanks were removed. After the removal, we found a very small amount of soil contaminated by fuel.	We found no groundwater contamination at the site	After discussions with the regulatory agencies, we treated the soil by a technology known as bioventing. The samples we took in June 2000 showed that the cleanup was complete and the property is available for unrestricted use.

BTEX	benzene, toluene, ethylbenzene, and xylene
EPA	U.S. Environmental Protection Agency
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
TCE	trichloroethylene

effective. Detailed cost estimates for each option are in the Feasibility Study Report.

The first option listed for each site is "No action." We are required by law to include this option for every site, just to provide a point of comparison. You may notice that we used different sets of options at different sites. This is because not all cleanup methods are right for all types of chemicals.

We looked at groundwater cleanup separately from the soil. That process is described on page 10 under "Groundwater cleanup options."

Soil cleanup options

Here are the soil cleanup methods that were on the short lists of options for these sites:

Soil Vapor Extraction: This involves blowing air through the soil to change the chemicals to vapor or gas form. The vapors are then vacuumed up through extraction wells and treated with either thermal oxidation or carbon adsorption. (See below for descriptions of these two treatments.)

Bioventing: This involves blowing air into the soil to stimulate the action of natural microbes (bacteria) in the soil. These microbes break down the chemicals into harmless by-products.

Carbon adsorption: The chemical vapors from the soil vapor extraction system are sent through carbon filters. The chemicals stick ("adsorb") to the carbon. The carbon filters are replaced when they get full.

Thermal oxidation: The chemical vapors from the soil vapor extraction system are sent to a thermal oxidizer, a furnace unit that literally burns off the contaminants. The exhaust from the thermal oxidizer meets federal and state clean air requirements.

Site 1 – Aircraft Isolation Area

Option 1. No action.

Option 2. Dig out (excavate) and take away the contaminated soil that was left after the earlier removal. This option would only be needed if the site were for residential use. But because the site is so close to the aircraft runways, the land is not suitable for residential use.

Table 2: Levels of Chemicals Found in the Groundwater Compared to EPA Standards

Site	Chemical	Highest level found (in parts per billion)	Cleanup standard (drinking water) in parts per billion
2/27	Benzene	190	1
	1,2 Dichloroethane	23	0.5
	Trichloroethene	190	5
8	Trichloroethene	560	5
	Tetrachloroethene	320	5
	Cis-1,2-Dichloroethene	420	6
	Carbon Tetrachloride	2.4	0.5
36	Benzene	18	1
	Cis-1,2-Dichloroethene	1700	6
	Tetrachloroethene	6.1	5
	Trichloroethene	39	5
	1,4-Dichlorobenzene	100	5
	Carbon Tetrachloride	0.91	0.5

Preferred option

Option 3. Put land use controls on the property to make sure it stays industrial in the future. This means that the site cannot be used for housing, schools, or hospitals. The soil is safe for industrial use.

Site 2 – Waste Oil Tanks/Solvent Tanks and Site 27 - Building 422 Underground POL Tanks

Sites 2 and 27 were grouped together because they have similar chemicals in the soil and because their two groundwater plumes have merged. The purpose of the soil cleanup is to get rid of the source of contamination of the groundwater.

At Site 2 we put in a soil vapor extraction system in 2002, and we hope to put in one at Site 27 in 2003.

Option 1. No action.

Option 2. Place land use controls on the site to restrict human contact with the contaminated soil and groundwater. Continue to monitor the soil and groundwater. This would not clean up the site, although some cleanup would occur by natural processes.

Option 3. Bioventing. This would clean up the site but would take longer than the fourth option, described below.

Preferred Option
Option 4. Continue using the soil vapor extraction systems that are already in place. This would clean up the site at a reasonable time and cost. The systems in place now use thermal oxidation. We plan to switch to carbon adsorption once the cleanup is further along.

Site 8 – Flightline Shop Zone

The purpose of the soil cleanup is to get rid of the source of contamination of the groundwater. We put in a soil vapor extraction system at one location within Site 8 with carbon adsorption in 2002.

Option 1. No action.

Option 2. Control the use of the site to restrict human contact with the contaminated soil and groundwater. Continue to monitor the soil and groundwater. This would not clean up the site, although some cleanup would occur by natural processes.

Preferred Option
Option 3. Continue using the soil vapor extraction system already in place and install other soil vapor extraction systems. This would clean up the site at a reasonable time and cost.

No further action is needed for the PAHs since the amounts left behind after the cleanup meet EPA standards for all uses.

Site 11 – Bulk Fuel Storage Area

Option 1. No action.

Option 2. Dig up (excavate) the contaminated soil and take it off base for disposal in a special landfill.

Option 3. Dig up (excavate) the contaminated soil and take it off base to be cleaned. The soil would be cleaned by heating it in an incinerator to burn off the chemicals.

Options 2 and 3 would work, but are very expensive and would not be cost-effective.

Preferred Option
Option 4. Limit exposure by restricting land use. The site is now a working fuel yard and the exposures to workers are within safe levels according to the U.S. EPA.

Site 36 – Building 458 Leach Pit

The purpose of the soil cleanup is to get rid of the source of contamination of the groundwater. We put in a pilot soil vapor extraction system with carbon adsorption in 1999.

Option 1. No action.

Option 2. Control the use of the site to restrict human contact with the contaminated soil and groundwater. Continue to monitor the soil and groundwater. This would not fully clean up the site, although some cleanup would occur by natural processes.

Preferred Option
Option 3. Continue using the soil vapor extraction system already in place. This would clean up the site at a reasonable time and cost.

Site 37 – PCB Spill at Building 317

No further action is needed for the PCBs. The small amount left after the earlier cleanup action meets EPA standards for all land uses.

Site 39 – Abandoned Gas Station

No further action is needed. We have already removed the fuel contamination.

Groundwater cleanup options

For groundwater contamination (at Sites 2, 8, 27 and 36), we did a similar analysis of cleanup options. The result was that we chose the same cleanup method (Option 5, groundwater extraction with carbon adsorption) for all sites. The following is a description of all the options we looked at.

Option 1. No action.

Option 2. Groundwater extraction and ultraviolet oxidation. The groundwater is pumped out, mixed with hydrogen peroxide, and passed through tanks where it is treated with high intensity (ultraviolet) light to break down the contaminants.

Option 3. Groundwater extraction and air stripping with carbon adsorption. The groundwater is pumped out and passed through tanks where it is sprayed with air. This moves the chemicals from the water to air, then the air is cleaned by passing it through carbon filters.

Option 4. Air sparging and vapor extraction with carbon adsorption. This is similar to air stripping, but the air is blown directly into the groundwater instead of pumping out the groundwater. Cost:

Preferred option
Option 5. Groundwater extraction with carbon adsorption. The contaminated water is pumped out and passed through carbon filters. The chemicals stick to the carbon, cleaning them out of the water.

Option 1 would not protect human health and the environment. Options 2, 3, and 4 are harder to use and /or more expensive than the preferred option. Option 5 cleans the water in the most cost-effective way.

We will consider all comments before making a final decision

After evaluating the comments on this Proposed Plan, the Air Force and regulatory agencies will make a final decision on the proposed actions for soil and groundwater cleanup. If requested, we may extend the comment period by 30 days. Requests for a 30-day extension must be received in writing by the Air Force no later than October 8, 2003. We will address all comments in the "Response to Comments" portion of the Record of Decision, the final decision document for these sites.

How to get the OU2 reports and other cleanup program documents

To see the Remedial Investigation and Feasibility Study for this Proposed Plan, or any other documents related the environmental cleanup program at March Air Reserve Base, please call Eric Lehto at (909) 655-5060

Glossary

BTEX, or benzene, toluene, ethylbenzene and xylene: These are usually the most toxic chemicals in petroleum fuels.

CERCLA: Comprehensive Environmental Response, Compensation, and Liability Act. CERCLA, commonly known as "Superfund," was passed into law in 1980. CERCLA established a program to identify sites where hazardous substances have been or might be released into the environment, ensure that they are cleaned up by the responsible parties or the government, and evaluate damages to natural resources.

NCP: National Oil and Hazardous Substances

Pollution Contingency Plan. The federal law that makes the rules on how to respond to releases (spills, dumping, etc.) of hazardous waste.

PAHs: Polycyclic aromatic hydrocarbons. A group of over 100 different chemicals that are formed from the incomplete burning of coal, oil and gas, or other organic substances. At March AFB, these chemicals mostly come from burned fuels.

PCBs: Polychlorinated biphenyls. Chemicals found in the coolants and lubricants in transformers, capacitors, and other electrical equipment.

Record of Decision: A legally binding, public document that explains which cleanup alternatives will be used to clean up a site.

TCE: Trichloroethene or trichloroethylene. A chemical in cleaning solvents. TCE is found at many Air Force bases because it was used for cleaning and de-greasing aircraft and equipment.

Who to Contact for More Information

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